

Landscapes

By examining the Flathead Reservation's big "rooms", we were able to define fourteen landscapes, each with its own unique visual and physical characteristics. (Landscapes, p. 7) These landscapes have visual and ecological qualities that the road must respond to and respect. The informal landscape place references used in the graphic are derived from a dominant landscape feature or characteristic, and from design team and committee input.

By looking at these individual landscapes, ideas began to form of how the road should be influenced by, and respond to, the land. (Landscapes – Photomontages, pp. 8-11) The Pablo Pines landscape, for example, is characterized by pine-covered sand hills that were formed when winds blew down off the glaciers that created Flathead Lake. In this area, a responsive design approach would maintain and restore the pines and rolling character of the sandy hills close to the road. This would also increase the perception that the road is integrated with the land rather than slicing through it. In contrast, the Ronan Spring Creek landscape consists of gently rolling low hills of pasture and cropland, and the road should reflect this rolling, undulating character.

Cultural and Historic Resources

One aspect of this project that makes it so unique is that the highway is located entirely within the Flathead Indian Reservation. As a consequence, much of our research focused on the cultural and historic resources of the area.

The CSKT wanted to ensure cultural concerns were addressed in the design alternatives without having to identify individual ritual and sacred sites. After considering several options on how to communicate the cultural importance, the decision was made to associate cultural information with wildlife issues. As a result, discussions about wildlife habitat, wildlife migration, and habitat restoration imparted cultural issues and concerns as well.

Wildlife Crossing Research

In the United States, an estimated one million vertebrates-amphibians, reptiles, birds, and mammals are killed on roads and highways each day. In short, roads have a tremendous impact upon wildlife. American Indians are particularly sensitive to this issue. Since the CSKT recognize the Flathead / Mission / Jocko Valleys as their homeland as well as the homeland for a variety of wildlife, it was important that any new road design allow wildlife to cross the road safely. Roads disrupt natural migration patterns, destroying habitat areas and connections between habitat patches. Due to the impacts of roads, populations of some species have declined dramatically, ecological balance has been changed, wildlife is being forced into more developed areas, where human-wildlife encounters have increased considerably.

By working with scientists and wildlife specialists, we were able to identify habitat areas and migration patterns for specific wildlife. In particular, we looked at road-kill data, tracking information, and sightings to determine where wildlife currently cross the US 93 corridor. (Fish & Wildlife Crossings – Migration Patterns, p. 12) We also were interested in identifying historic migration patterns that have been interrupted by the current US 93. Perhaps it would be possible to restore those traditional wildlife movement patterns if the road was not such a barrier.

We also analyzed current construction techniques for wildlife crossings in order to determine an approach that would work best for US 93. In particular, we studied the wildlife crossings that have been developed for several different highway projects, including the Linn Cove Viaduct (Blue Ridge Parkway, North Carolina), Interstate 70 (Glen Canyon, Colorado), Interstate 75 (Florida), Trans-Canada Highway (Banff, Canada), US Highway 2 (Montana), and State Highway 58 (San Bernadino County, California). (Fish & Wildlife Crossings – Examples of crossing structures, pp. 13-17) Various types of crossing structures were evaluated as to their size, cost, design intent, types of animals they are suitable for, the effectiveness of a specific type of crossing, and what animals use the crossings. In doing this evaluation, we could begin to make determinations about which types of crossings are best suited for specific situations along US 93.

All of this research was incorporated into the design and alignment concepts, and the result was a series of proposed wildlife crossing structures for the entire length of the project. (Fish & Wildlife Crossings – Proposed Crossing Structures for US 93, p. 32) Each individual crossing is presented in greater detail in the **Wildlife Crossings Workbook**.

For many of the wildlife crossing structures to function properly, it will be necessary to use some type of fencing to help control movement and funnel wildlife toward the crossing structure. Eight-foot high page wire fencing designed specifically for wildlife control is recommended for segments of the reconstructed US 93. This fencing is similar to that used for the Trans-Canada Highway in Banff. (Wildlife Fencing – Concepts for US 93, pp. 33-34)

Opportunities and Constraints

The inventory and analysis phases of the project lead to the delineation of “Opportunities and Constraints” areas based on the landscape and cultural context. The opportunities and constraints mapping identified zones of opportunity where natural, cultural, and scenic resources can be dodged or only minimally affected by potential highway improvements, and areas of constraint where resources would be adversely affected by highway improvements. This information was used as the basis for developing initial design concepts for the reconstructed road and roadside improvements and visitor amenities.

In order to make the project more manageable, the fourteen landscapes were combined into five separate design segments. The five segments are as follows:

- Evaro Design and Alignment Concept (p. 18)
- Arlee to Ravalli Design and Alignment Concept (p. 21)
- St. Ignatius Design and Alignment Concept (p. 23)
- Ninepipe Design and Alignment Concept (p. 26)
- Ronan to Polson Design and Alignment Concept (pp. 28-29)

Design and Alignment Concepts

For each design segment, we explored a wide range of design concepts and recommendations for the reconstructed road. The three governments agreed that all design concepts should be considered unless there was consensus to remove one from consideration. An iterative process was developed for each design segment that consisted of generating the conceptual ideas, reviewing those concepts with the three governments – Federal Highway Administration (FHWA), Montana Department of Transportation (MDT), and the Confederated Salish and Kootenai Tribes (CSKT) – and the prime consultant – Skillings-Connolly, Inc. – and then refining the design concept.

In formulating the design concepts over the length of the road corridor, a decision was made to start on the south end of the reservation at the community of Evaro and proceed north with the concept development. For each of the five design segments, ideas and concepts were generated for road alignment, lane configuration, fish and wildlife crossing structures, wildlife fencing locations, interpretive opportunities, community entry signs, and other roadway features.

In addition to the general recommendations for the five design segments, detailed concepts were developed for specific areas along the corridor where there were special concern.

Following is a brief overview of the places where additional focus was needed to address the unique conditions and issues associated with that place.

- The Evaro Hill area is a major wildlife corridor that links the grizzly populations of the Mission Range / Bob Marshall to the Bitterroot grizzly bear recovery zone to the west. How wildlife crossings are incorporated into the road design is critical if wildlife is going to be able to move safely through the area. (Evaro Hill Wildlife Crossings, p. 19)